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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/542,942	03/31/2000	Stephen S. Ho	M0635/7065 (RJK)	4931

7590 10/03/2002

Ronald J Kransdorf
Wolf Greenfield & Sacks PC
600 Atlantic Avenue
Boston, MA 02210

EXAMINER

ABDULSELAM, ABBAS I

ART UNIT PAPER NUMBER

2674

DATE MAILED: 10/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/542,942

Applicant(s)

HO ET AL.

Examiner

Abbas I Abdulsalam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-8,10-27,29-33 and 35-66 is/are pending in the application.
- 4a) Of the above claim(s) 3,9,28 and 34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8,10-27,29-33 and 35-66 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claim 1-2, 4-8, 10-27, 29-33 and 35-66 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections 35 U.S.C. 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 3, 9, 28 and 34 are cancelled by the applicant and claims 1-2, 4-8, 10-27, 29-33 and 35-66 are rejected under 35 U.S.C. 102(e) as being anticipated by Shih et al. (USPN 6421048).

Regarding claims 1, 10, 26, 35, 43, 47, 52, and 62, Shih teaches a user, a hepatic interface device (10), virtual object (26), an interaction with a virtual object, and a force feedback

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produced by the haptic rendering process. See col. 5, lines 13-16. Shih teaches the virtual object (26) being implemented as a volume of voxels (78) with each voxel and the volume storing a density value and a density threshold value respectively. See col. 15, lines 7-45. Shih further teaches a virtual surface (25) of a virtual object (26) and a virtual tool guided by the user using haptic interface device (10). See Fig 2B. Shih teaches tool points that are stored in a separate point array of local points intended to represent the tool. See col. 26, lines 29-35 Furthermore, Shih teaches a scenario where a user is moving the haptic interface device so that the virtual tool (28) is moving toward the virtual surface 25 of the virtual object (26). See Fig 5A. In addition, Shih teaches collision detection between a virtual tool (28) and a virtual object (26) and the resulting forces that form a collision, depth of penetration and direction of the impact. See col. 18, lines 61-67. Shih further teaches calculations of a vector (101) from a point (S3, S4) from direction of a movement and points of penetration. See Fig 5 (B-C). Moreover, Shih teaches haptic rendering process (16) that determines the vector (101) and an interaction force to be applied with respect to a user movement of the virtual tool and the resulting feedback force. See col. 14, lines 41-68. Shih also teaches a CAD system, the haptic interface device sensing six degree of freedom and haptic rendering process (16) determining geometry of the virtual surface. Shih teaches haptic the rendering process in terms of location (98), surface (25) and using a path for the tool (28). Shih also teaches the rotation of a virtual tool (28) or moving the tool in different angles. See col. 1, lines 24-35, Fig 5C, Fig (8A-C), col. 8, lines 58-63, col. 10, lines 43-46. Therefore an identical system is described as taught by Shih.

Regarding claims 4, 18, 29 and 37-38, Shih teaches a way to locate the virtual surface (25) in terms of binary search. See Fig 14 (A-C).

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Regarding claims 5 and 30, Shih teaches the haptic rendering process (16) and the amount of penetration into the virtual object (26). See col. 10, lines 35-36.

Regarding claim 6, Shih teaches a virtual representation of multiple discrete points. See col. 3, lines 25-30.

Regarding claim 11, Shih teaches the use of CAD system in connection to virtual reality technique. See col. 1, lines 24-42.

Regarding claim 20, Shih teaches a region of volume as it relates to a gradient (80) for a virtual object (26) including a tool point (224) and a final tool surface contact point (226). See Fig 13.

Regarding claim 36, Shih teaches a voxel value at any point, which gives an indication of the penetration depth and the shortest distance between the voxel (78) and the surface (86) of the volume. See col. 16, lines 16-18.

Regarding claim 39, Shih teaches a haptic interface location and the movement of the virtual representation based on geometry of the surface. See col. 3, lines 30-37.

Regarding claims 23 and 40-41, Shih teaches the points of the virtual tool (28) in terms of algebraic equation expressed in 3-D shape in a virtual environment. See col. 7, lines 38-44.

Regarding claims 8, 21-22, 24-25, 42, 54-60 and 65-66, Shih teaches a virtual tool (28) which is a software object determining if contact has occurred with a virtual object (26) and determining the surface direction vector (101). See col. 5, lines 53-56.

Regarding claims 2, 27, 53 and 63, Shih teaches an interface device (10) sensing six degree of freedom and haptic rendering process (16) determining geometry of the virtual surface. See col. 8, lines 58-63 and col. 10, lines 43-46.

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Regarding claims 7, 12-17, 19, 28, 31-33, 44-46 and 49-51, Shih teaches a volume storing a density threshold value and points having a threshold value greater or less than the density threshold. See col. 15, lines 21-34.

Regarding claim 48, Shih teaches a three dimensional configuration in the virtual space and a virtual tool (28) penetrating the virtual object (26). See Fig 1 & Fig 2B.

Regarding claims 61 and 64, Shih teaches a haptic rendering process (16) in terms of haptic location (98), surface (25) and using path for the tool (28). Shih also teaches the rotation of a virtual tool (28) or moving the tool in different angles. See Fig 5C.

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Conclusion

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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4. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Abbas Abdulsalam** whose telephone number is **(703) 305-8591**. The examiner can normally be reached on Monday through Friday (9:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Richard Hjerpe**, can be reached at **(703) 305-4709**.

Any response to this action should be mailed to:

Commissioner of patents and Trademarks

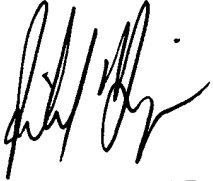
Washington, D.C. 20231

or faxed to:

(703) 872-9314

Hand delivered responses should be brought to crystal park II, Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology center 2600 customer Service office whose telephone number is (703) 306-0377.


RICHARD HJERPE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Abbas Abdulsalam

Examiner

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